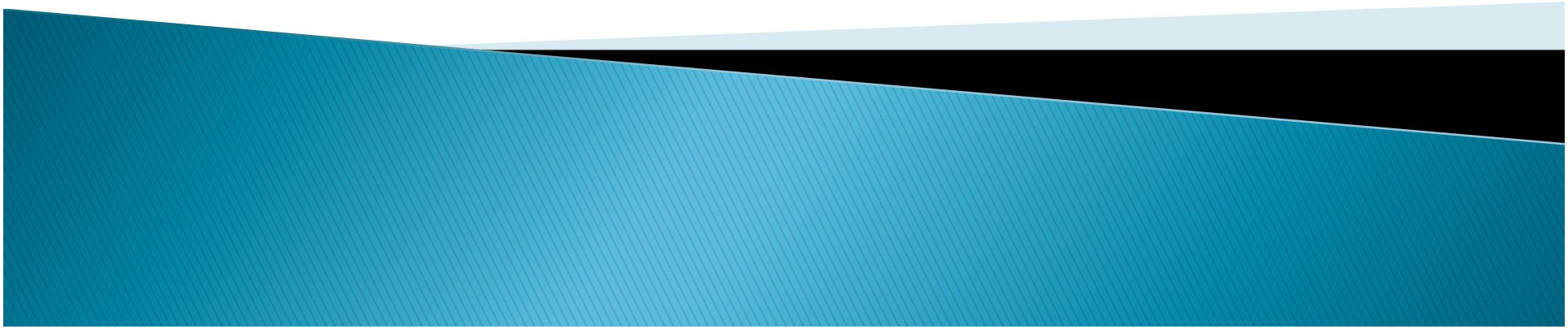
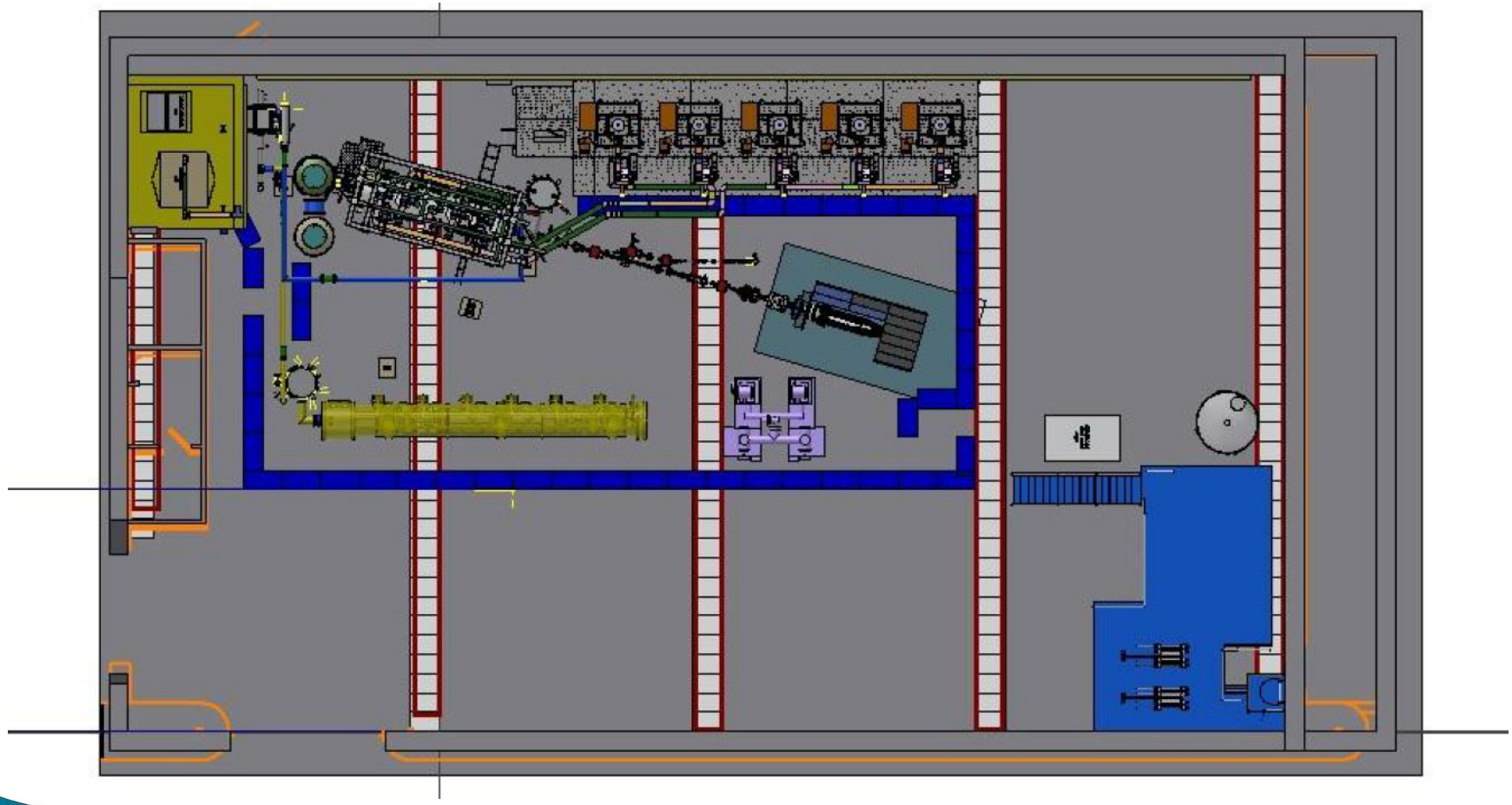
CBETA Technical Review

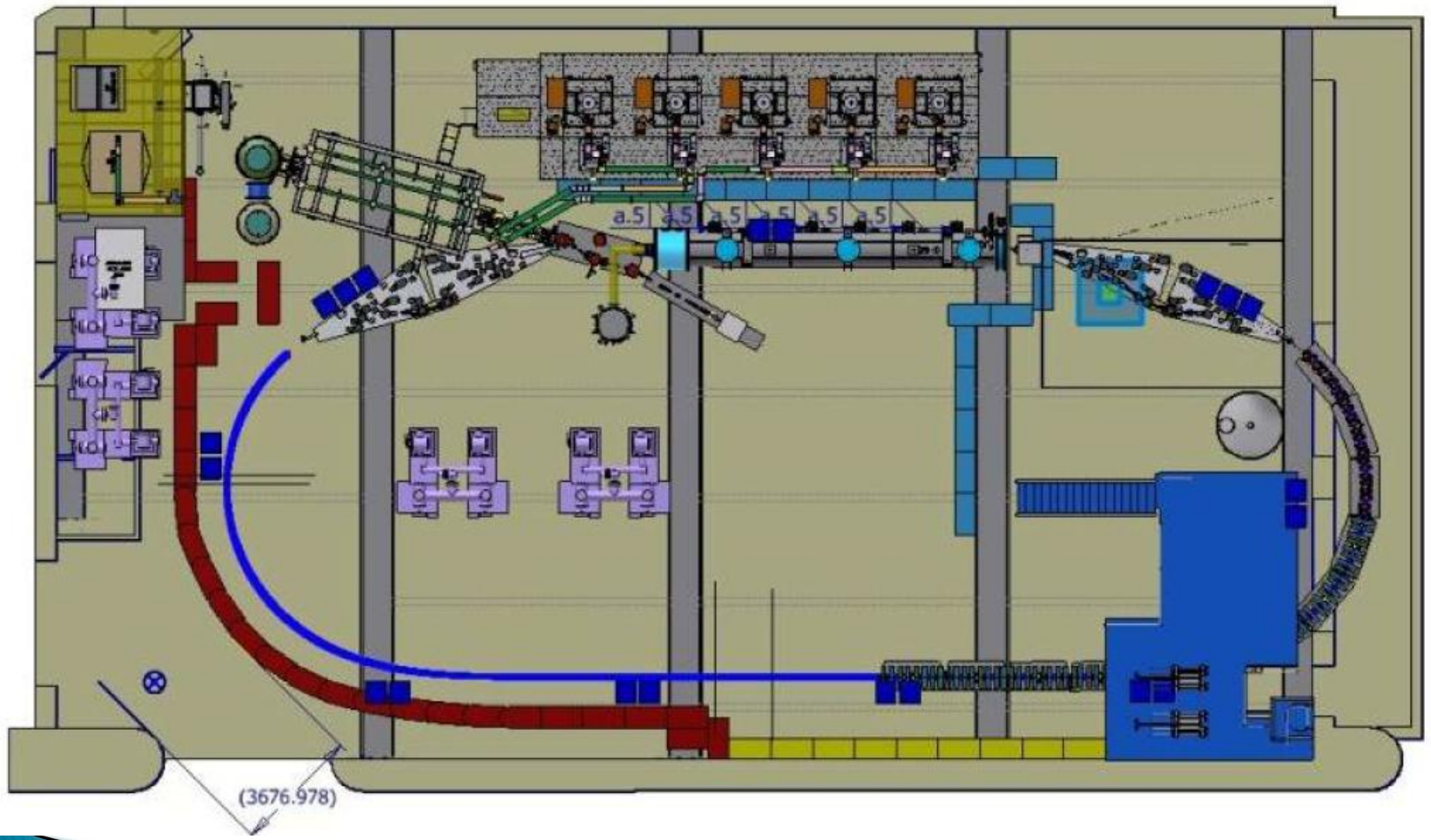
1.11 Systems Integration
January 31, 2017
Richard E. Gallagher



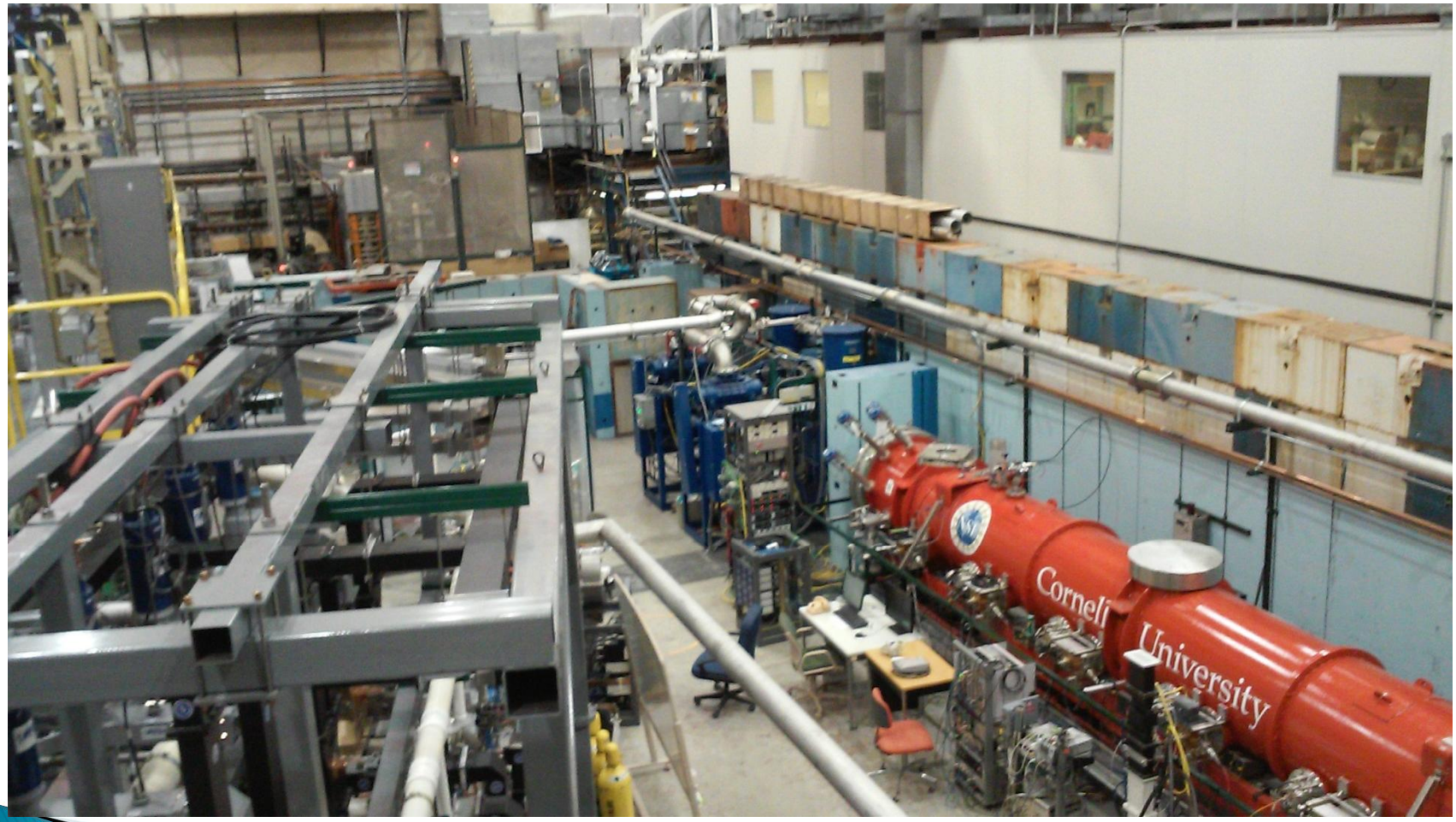
January 2017 Layout



2019 Layout



January 2017: 3 Major Move Actions



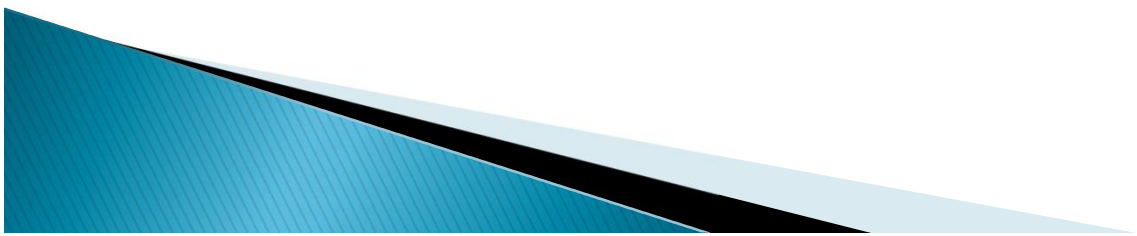
East-RF Power System

CBETA Beam-Stop goes here

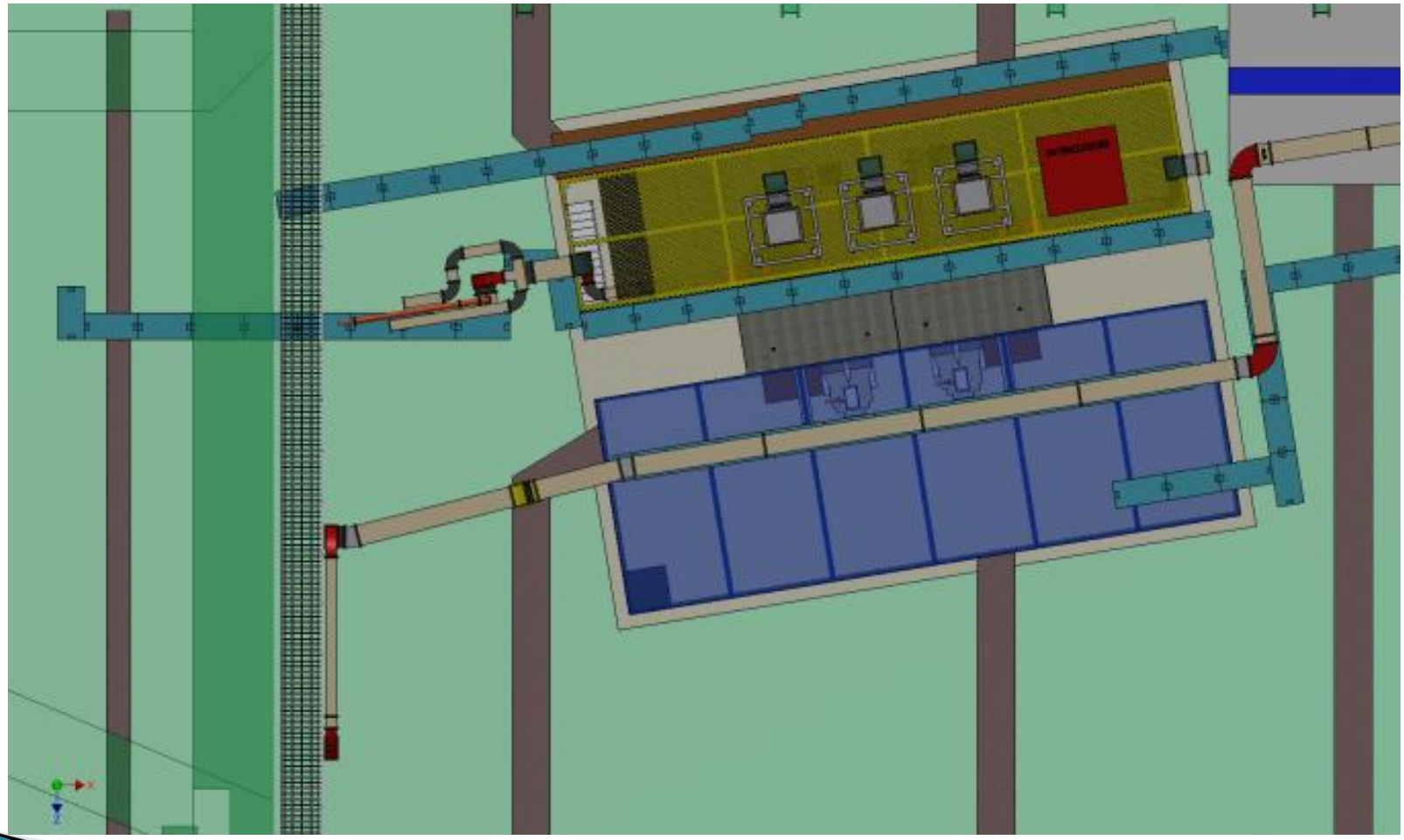
East-RF Power System Move

Since the system is essential to CESR-CHESS operations, a 2-part approach is necessary:

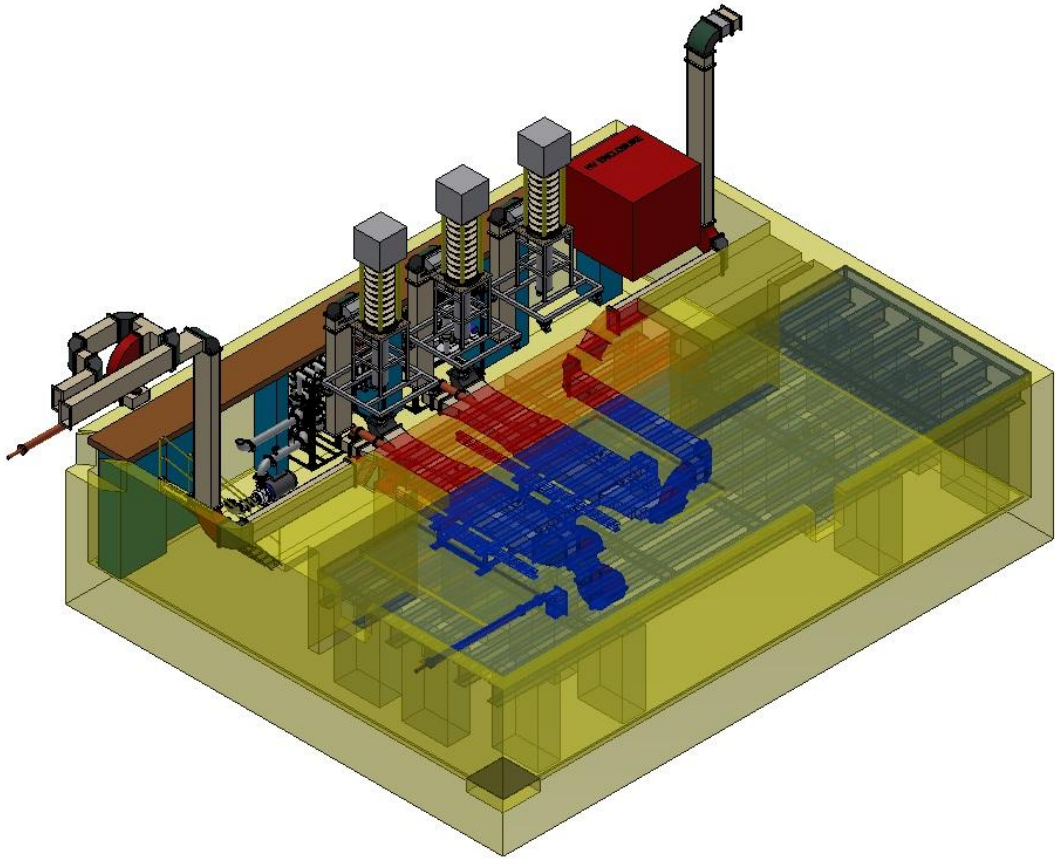
1. Re-route the RF waveguides to a new transmitter and modify controls
2. Re-create the East-RF system in the L0 Pit vacated by the CLEO Particle detector



East-RF powered by different transmitter



East RF move to L0 Pit



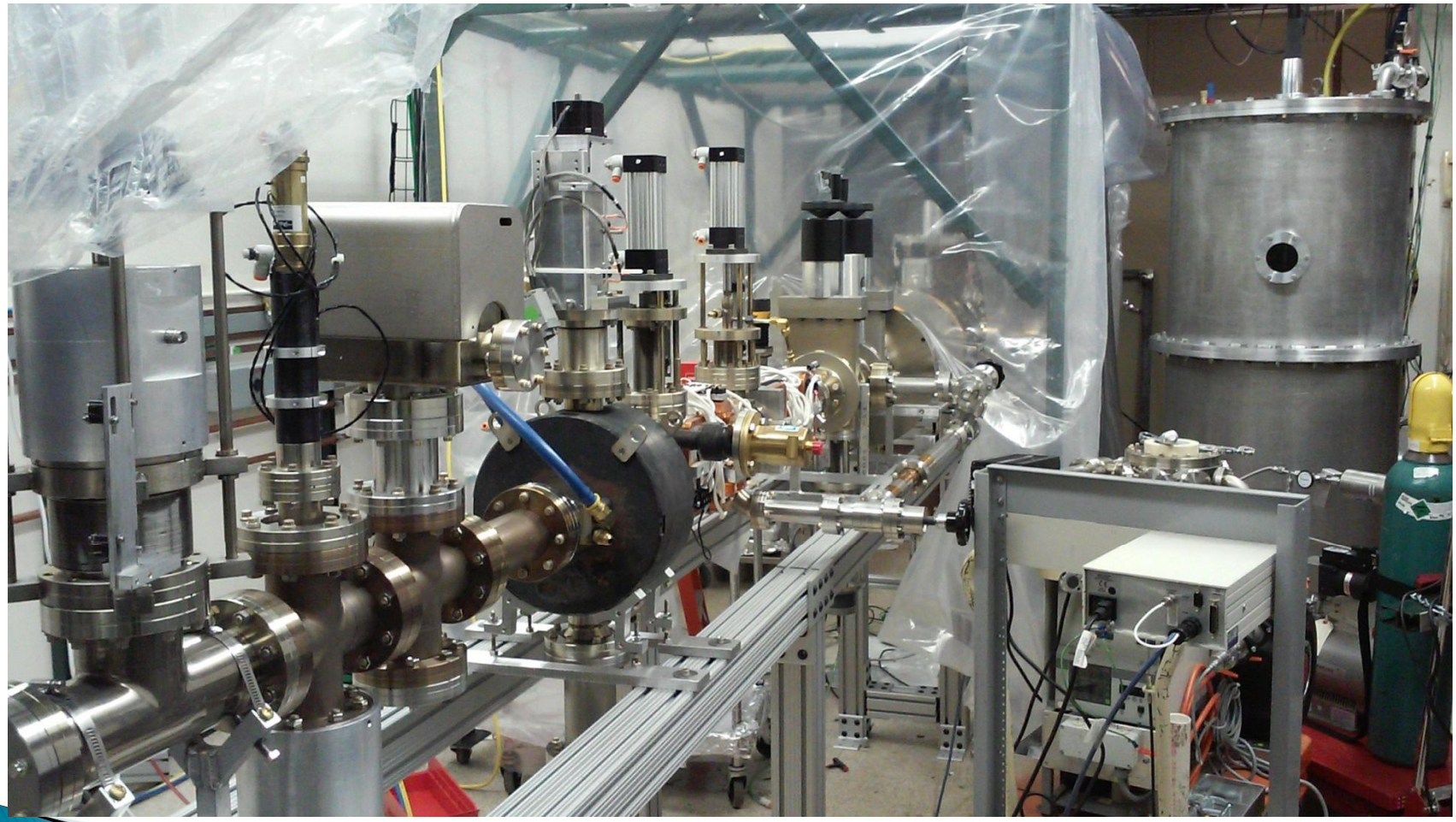
East RF Move Schedule

- January 2017: Start installing waveguide, cable tray, cables and related modification
- August 2017: Power east SRF cavities with different transmitter (commissioning while CESR-CHESS is off-line)
- October 2017: East RF Pit Transmitter on-line
- November 2017: Remove East RF components to permit wall modifications (maybe sooner)

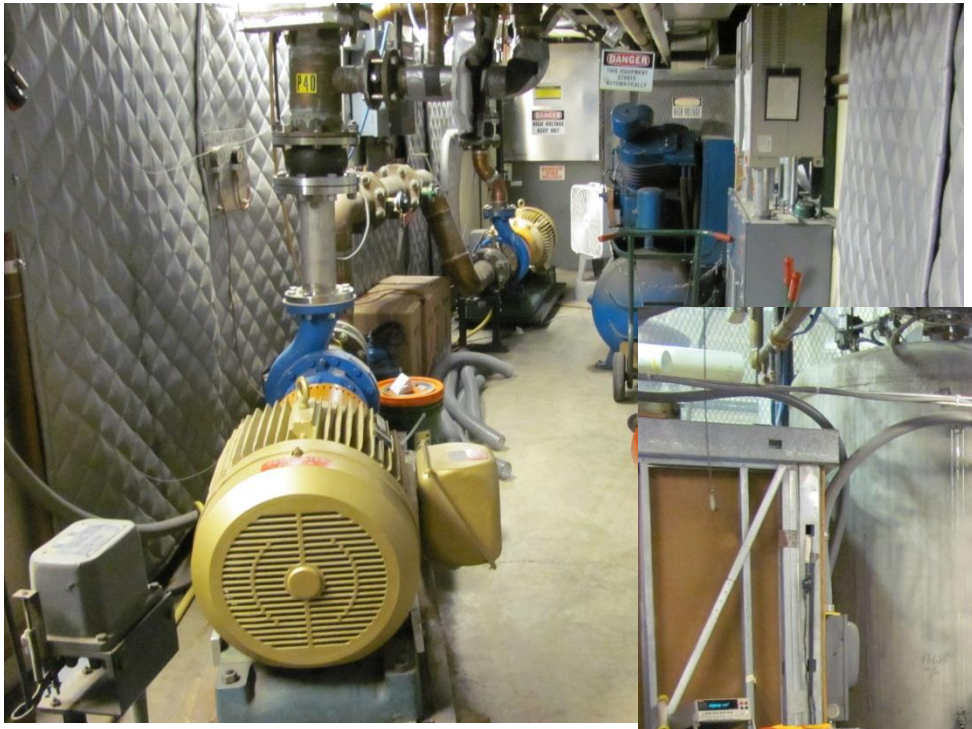
Remove the Vacuum Lab Structure

South beamline goes here

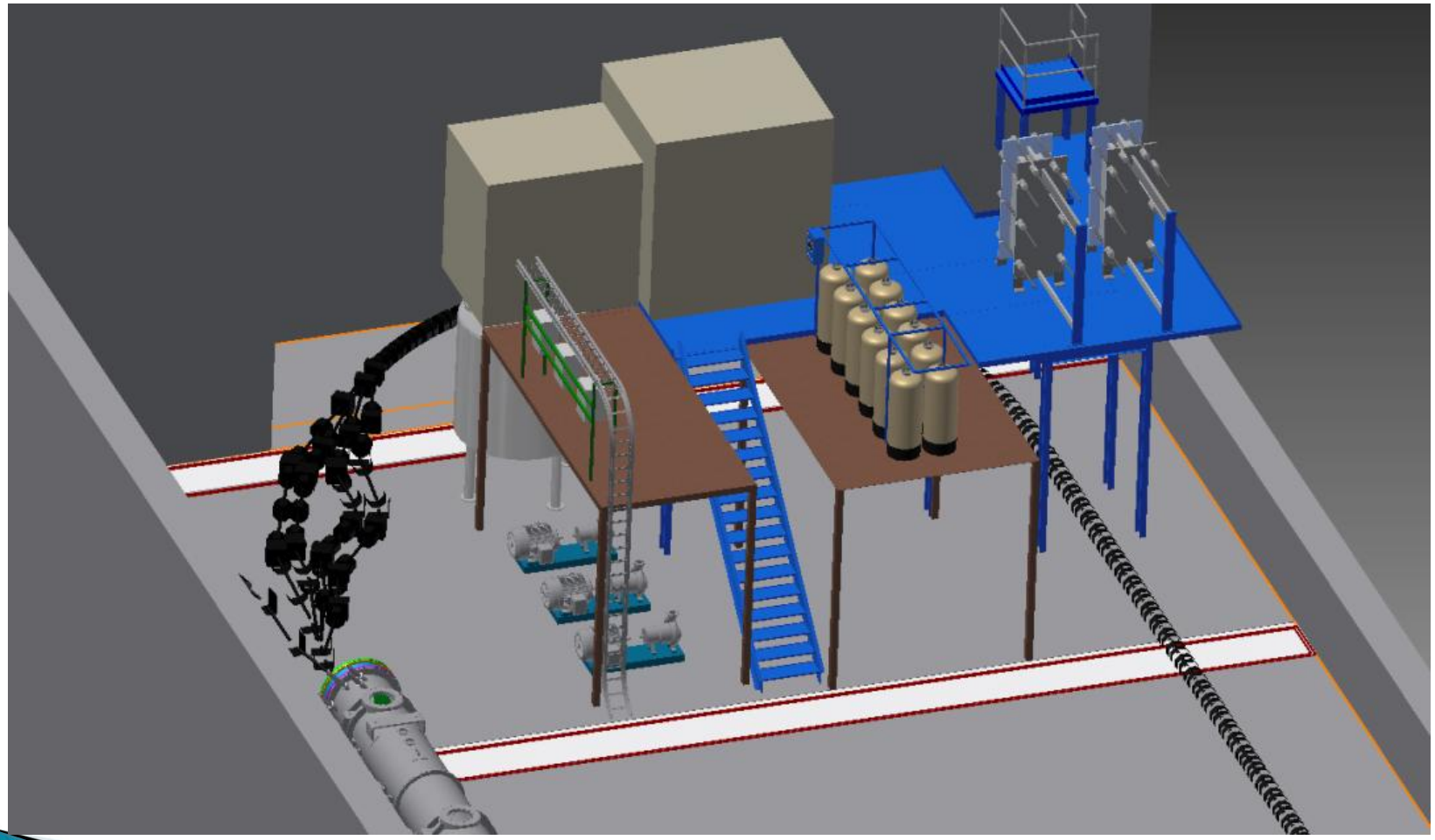
Relocate Gun Development Lab to make room for Vacuum Lab move



Reconfigure Cooling System: CESR-85F

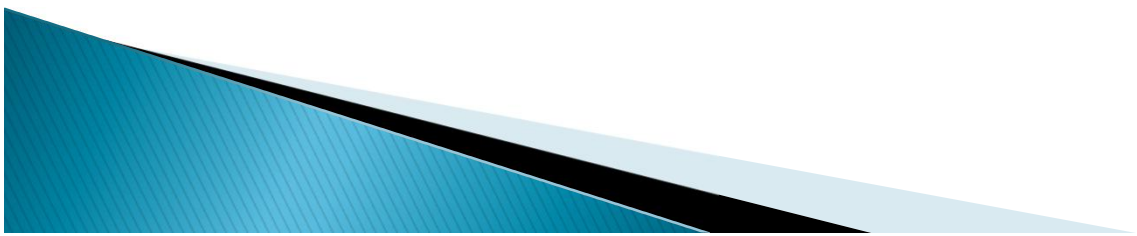


Reconfigure Cooling System: CESR-85F



Schedule for CESR-85F modifications

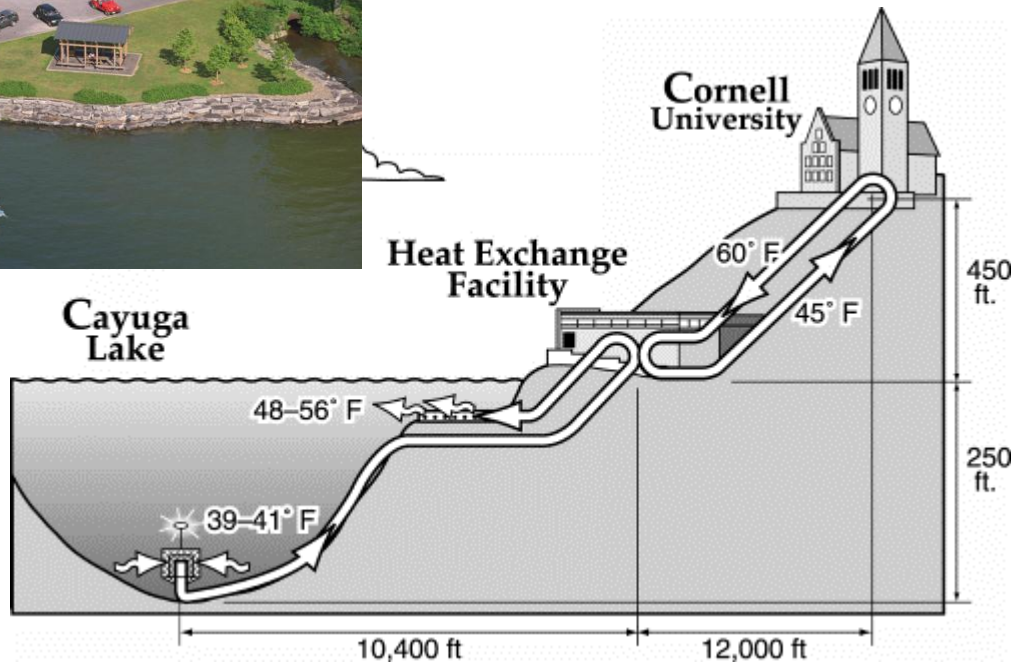
- June 2017: Install new platforms
- July 2017: Move pumps and DI tanks
- August 2017: Instrumentation and controls
- September 2017: Fully operational



Other Cooling Requirements

- Gun, ICM, klystrons, and existing beamline components are cooled by DI water systems.
- Little capacity left on existing DI water systems
- Dump cooling will require 75-gpm
- Beamline Halbach and Splitter magnet requirements are not final
- Plan is to install new closed loop heat exchangers
- Campus Chilled Water will be extended to high bay area, but need flow-temp-DI requirements

Campus Chilled Water (CCW)



Electrical Requirements

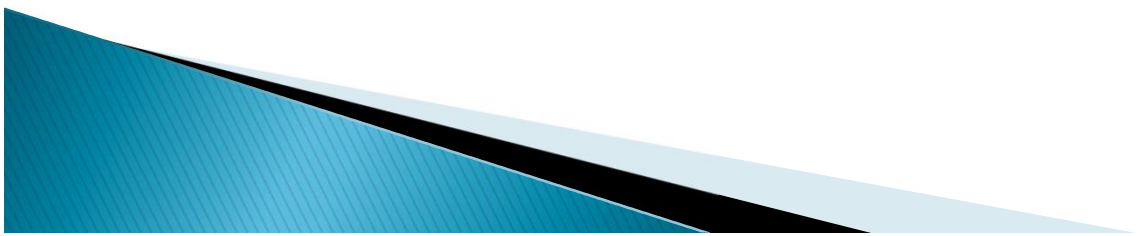
Electrical Requirements

- Final design specifications for:
  - Magnet PS
  - Beamline components
  - Instrumentation and controls
  - MLC SSA and pump skids
  - Cable trays and wire routes
  - Lighting and convenience outlets
  - Vacuum chamber bake-out
  - Air cooling (fans) and local ventilation
  - Metering

HVAC: temperature stability, humidity, air-flow and control

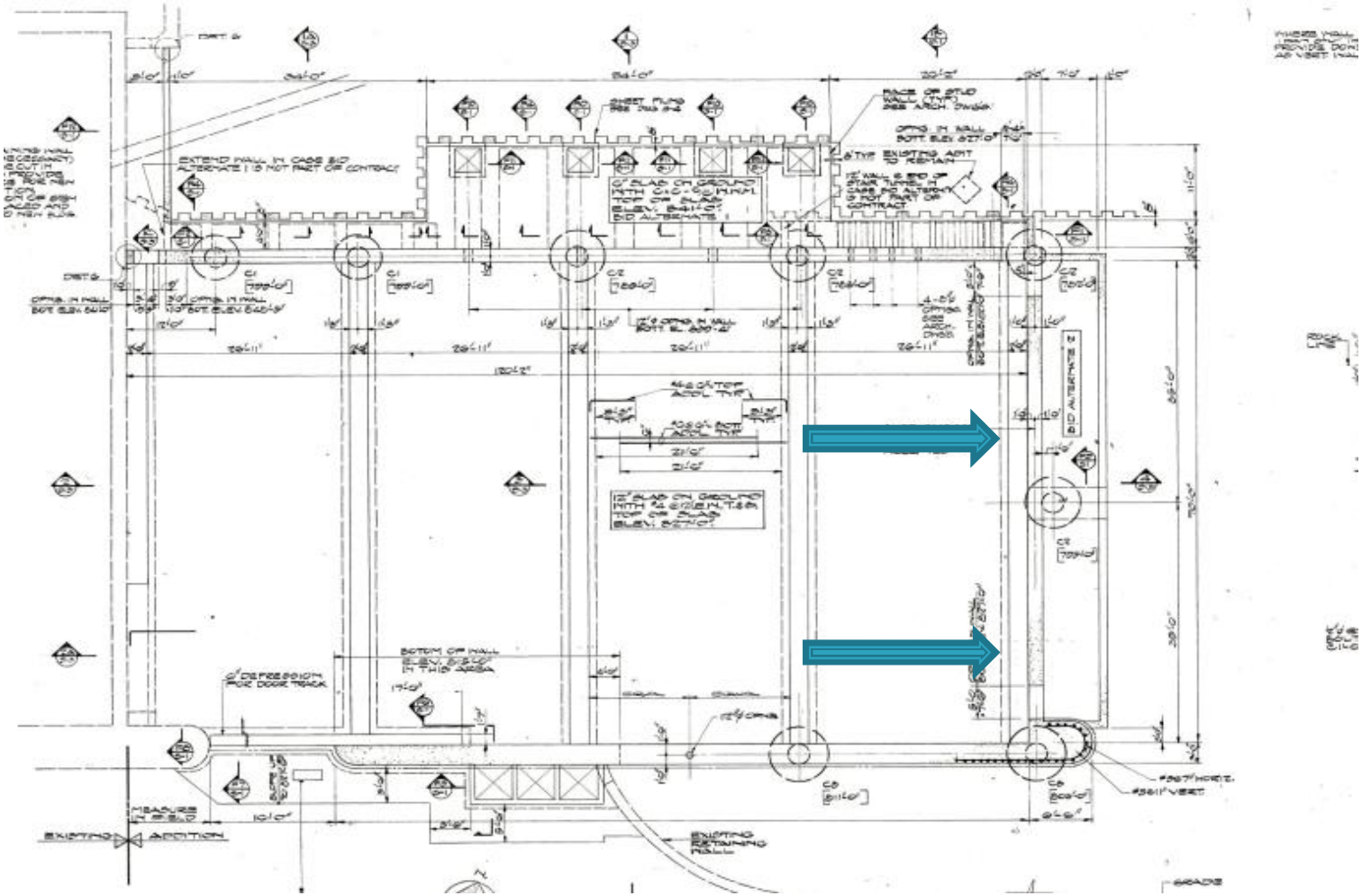
Other Utilities and Services

- IT hardware
- Network capacities: wired and wireless
- Compressed air
- GN2
- Survey and Reference system
- Fire detection and alarm
- Overhead crane access
- Drainage
- Potable water



East Wall Modification

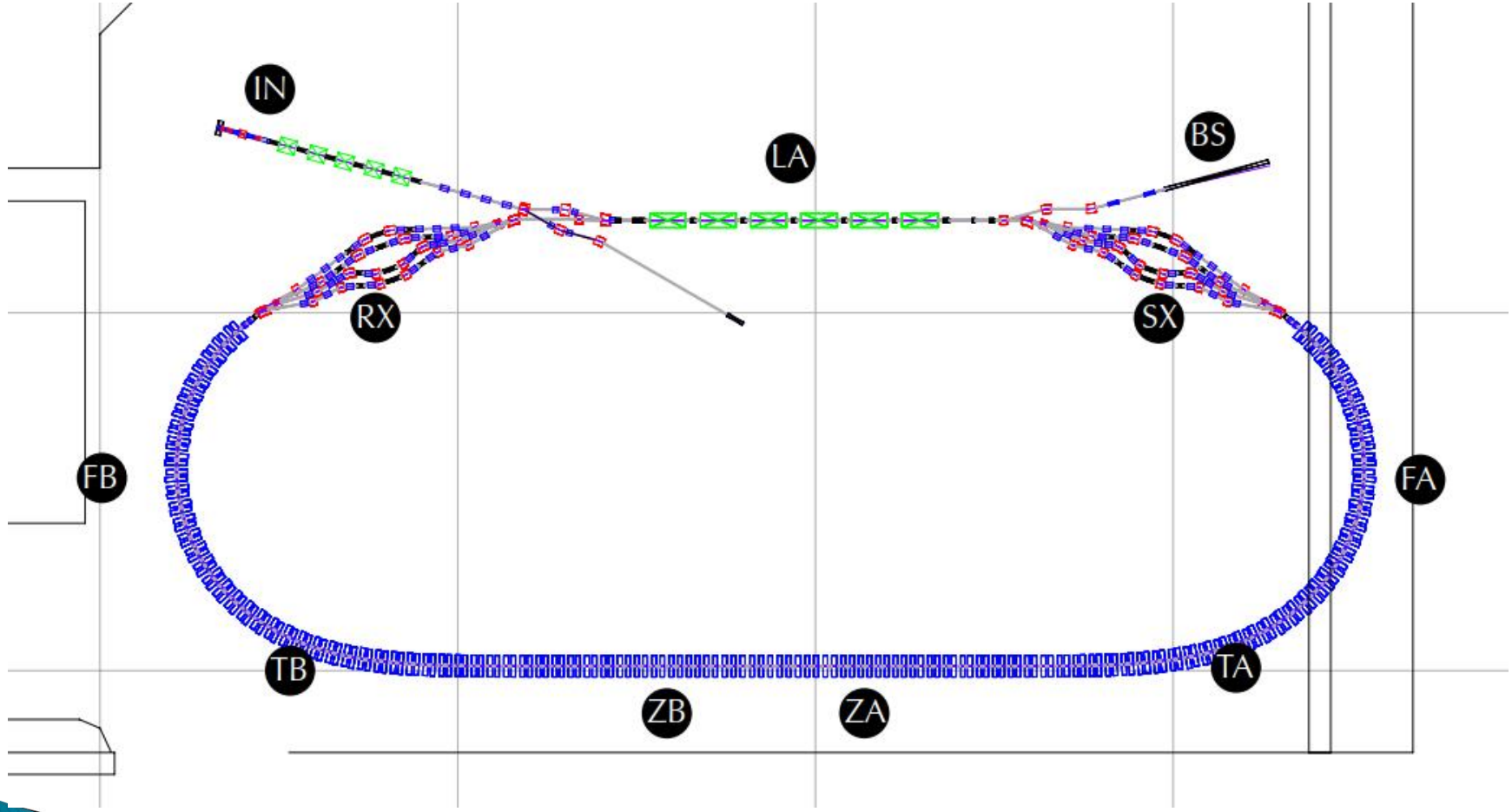
East Wall Modifications



East Wall Modification Schedule

- February 2017: Finalize location and sizes
- March 2017: Engineering review of concept
- June 2017: Engineering design
- August 2017: Contract bids and award
- December 2017: Construction
- January 2018: Start installation for Partial Arc Test

Beamline System Integration
Installation and Assembly



Beamline System Integration
Installation and Assembly Sequence

- Section 00-IN Gun and ICM are installed and operational
- Section 01-LA is the MLC relocation, and is in progress
- Section 02-SX Northeast merger in place February 2018
- The subsequent installations after the CHESS-U CESR work (November 2018)

Beamline System Integration
Installation and Assembly Sequence

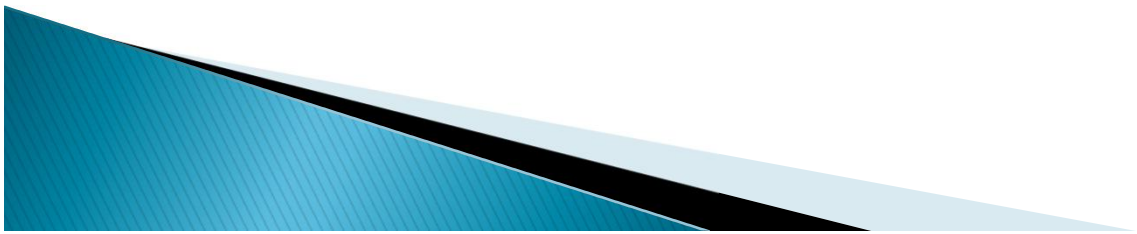
- Installation will be in a clock-wise sequence
- Sections 03-FA to 09-RX will be generally duplicate efforts
  - Alignment
  - Vacuum connections
  - Magnet power,
  - Controls and instrumentation
  - Cooling
  - Electrical
  - Compressed air
  - GN2

Beamline System Integration
Installation and Assembly Sequence

- **Section 10-BS Beam stop will be a more involved installation:**
  - **Alignment**
  - **Magnets**
  - **Beam pipes**
  - **Vacuum connections**
  - **Instrumentation**
  - **Electrical**
  - **Compressed air**
  - **GN2**
  - **Shielding**

Project Management

- Operating accelerator and X-ray programs
  - Requires detailed planning and scheduling for utility work and movement of components
- Competition for shared resources
  - Resource loaded schedules (MPP)
  - Common resource pool
  - Weekly reviews to identify potential issues
- Space Use
  - Documented use with strict time limits



1.11 Systems Integration

The End